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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/511,931	02/24/2000	Takayuki Sugawara	9281-3561	5649

757 7590 05/21/2004
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EXAMINER

BAKER, STEPHEN M

ART UNIT PAPER NUMBER

2133

DATE MAILED: 05/21/2004

19

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary

Application No.

09/511,931

Applicant(s)

SUGAWARA ET AL.

Examiner

Stephen M. Baker

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– The MAILING DATE of this communication appears on the cover sheet with the correspondence address –

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 February 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
2. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 5,737,344 to Belser *et al* (hereafter Belser).

Belser discloses a computer system (Fig. 4) including a disk drive, such as a magnetic hard or floppy disk, standard optical ROM or WORM disk, etc. The disk drive includes a "processing circuit" in the form of a buffer, processor and ECC unit (216, 202, 214), collectively for processing read and write data and commands and controlling operations of the disk drive. Belser thus shows a "disk drive including a head for reading data written to a disk and a processing circuit for processing the data". In Belser's system, essential error correction of disk data in individual sectors of a data from a DASD disk drive storage device (200) is performed in the conventional manner for such disk sectors (e.g. with Reed-Solomon coding – see col. 3 lines 55-58), by the hardware ECC unit (214) within the DASD disk drive storage device (200). Accordingly, in Belser's system "the processing circuit of said disk drive includes a low-level error correction code unit for performing error correction of the data written to a physical address corresponding to a single sector of the disk". The DASD disk drive storage device (200) is coupled by an interface (210) (e.g. a "SCSI-type" interface) to the host computer (212).

Processing for error correction performed with data read from more than one sector, based on a parity sector, can be performed by Belser's host computer. See col. 5, lines 62-67 with regard to host-based encoding of the parity sector, and col. 6, lines 20-23 with regard to corresponding host-based defective sector correction using the parity sector. The host computer apparently receives (step 704) an indication of a defective sector (presumably a sector uncorrectable by the ECC hardware) from the storage device in the conventional manner, as part of the (Fig. 7) process. Alternatively, additional host-based ECC decoding (col. 6, lines 61+), provided in addition to host-based parity sector decoding and the "additional" hardware ECC (col. 3, line 55) could provide the indication of a defective sector required for the (Fig. 7) recovery process. In no case does Belser suggest doing away with the "additional" hardware ECC unit. Accordingly, in Belser's system, "the host computer includes a high level error correction code unit for performing error correction of read data supplied through the interface and read from more than one sector of the disk".

Claim Rejections - 35 USC § 103

1. Claims 1-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,252,961 to Hogan (hereafter Hogan) in view of U.S. Patent No. 6,357,030 to Demura *et al* (hereafter Demura).

Hogan discloses a computer DVD system where DVD data error correction is performed at least partly by the host. The drive controller may also perform error correction on-the-fly. A host interface for the disk drive is of course required.

Regarding claim 1, Hogan doesn't specify that the drive's on-the-fly ECC process be performed one sector at a time while the host's ECC process be performed over multiple sectors at a time. Hogan's on-the-fly correction presumably would progress along rows of the double-encoded DVD block shown in Hogan's Fig. 4.

Demura shows that it was well known in disk ECC for DVD to encode a higher level of ECC over multiple sectors of a lower level of ECC. Reading apparently progresses a sector at a time. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to implement Hogan's DVD drive system such that the drive's on-the-fly ECC process is performed sector at a time while the host's ECC process is performed over multiple sectors at a time. Such an implementation would have been obvious because Demura shows that it was well known in disk ECC for DVD to encode a higher level of ECC over multiple units of a lower level of ECC.

Regarding claim 2, Official notice is taken that the desirability of providing disk drives with the capacity to be compatible with a variety of disk formats and distinguish between the variety of disk formats was well known at the time the invention was made. A CD-ROM provides a "high-reliability disk" with an extra level of ECC compared to a CD. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to implement Hogan's computer DVD system with a disk drive that can distinguish between DVDs, CD-ROMs and CDs and process their ECCs appropriately. Such an implementation would have been obvious because the

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desirability of providing disk drives with the capacity to be compatible with a variety of disk formats and distinguish between the variety of disk formats was well known.

Regarding claim 3, Official notice is taken that the desirability of providing ECC decoding for a variety of disk formats and of distinguishing between the variety of disk formats was well known at the time the invention was made. Official notice is also taken that providing information on a disk to distinguish the disk format was well known at the time the invention was made. It would have been obvious to a person having ordinary skill in the art at the time the invention was made to implement Hogan's computer DVD system with a disk drive that can distinguish between disk formats by information written to the disk, and that can process their ECCs appropriately. Such an implementation would have been obvious because providing information on a disk to distinguish the disk format was well known, as was the desirability of providing disk drives with the capacity to distinguish between formats and decode formats appropriately.

Regarding claims 5-7, each sector corresponds to a "physical address".

Regarding claim 8, both levels of error correction share "common" sectors.

2. Claims 2-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Belser in view of U.S. Patent No. 5,956,757 to Sun (hereafter referred to as "Sun").

Regarding claims 2 and 3, Belser apparently does not teach providing a single disk drive with the capacity to be compatible with a variety of disk data formats, however the types of disks described by Belser are apparently standard formats, which would include a standard format disk that does not have Belser's parity sectors. Belser's parity sector finding information (parity map) included on the disk provides a way of

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distinguishing between disks of the same format that do or do not have the parity sectors.

The desirability of providing disk drives with the capacity to be compatible with different standard disk formats was well known at the time the invention was made, as evidenced by Sun.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to implement Belser's computer system with a disk drive that can distinguish between a standard optical disk with no parity sectors and the same standard disk with parity sectors, and process their ECCs appropriately. Such an implementation would have been obvious because the desirability of providing disk drives with the capacity to be compatible with various standard disk formats was already well known, as evidenced by Sun. Regarding claims 5-7, each of Belser's sectors corresponds to a "physical address".

Regarding claim 8, both levels of Belser's error correction share "common" sectors.

Response to Arguments

3. Applicant's arguments filed 26 February 2004 have been fully considered but they are not persuasive.

Applicant has apparently misconstrued the scope of Belser's disclosure, as should be made clearer from the examiner's additional discussion of Belser's teachings noted in the rejection, presented above. The examiner of course considers a parity

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sector to provide an "error correction code" in the context of lower-level ECC's locating the erroneous sector to be corrected using the parity sector.

Regarding the Rejection based on Hogan and Demura, applicant believes that both the hardware ECC and host-based ECC software perform the lower and higher level ECC decodings, but does not appear to recognize that such an arrangement as argued by applicant is not inconsistent with the reasonable scope of the claims, which do not exclude the hardware or the software from performing either level of ECC decoding.

Conclusion

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen M. Baker whose telephone number is (703) 305-9681. The examiner can normally be reached on Monday-Friday (11:00 AM - 7:30 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Albert DeCady can be reached on (703) 305-9595. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Stephen M. Baker
Primary Examiner
Art Unit 2133

smb